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By K. N. Tokarich

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## FOREWORD

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## OCCUPATIONAL NATURE OF CERTAIN INFECTIONS WITH NATURAL FOCI

-USSR-

Following is the translation of an article by K. N. Tokarich in Gigiyena truda i professional'nye zabolevaniya (Sanitation and Occupational Diseases, Vol IV, No 12, Moscow, December 1960, pages 3-7.)

Legislation is presently being carried out regarding the number of occupational, infectious, and parasitic diseases similar to the infections picked up by people who become ill at work (tuberculosis, brucellosis, anthrax, glanders, tetanus, hydrophobia, etc.) There are indications that infectious diseases contracted outside of work should belong to the category of occupational diseases. This would make it possible to expand the category of infectious occupational diseases.

In 1931 I. F. Berezin wrote a description of tularemia, the direct source of which is the meat processing of diseased hares. Infection was caused by direct contact; therefore in the majority of cases the bubonic form of the disease occurred. In one of the steppe rayons in the middle of the European part of the USSR, Yu. A. Myasnikov noted in the winter of 1948-49 that tularemia was connected with sugar beet processing which was carried out in a factory located in another region. At this time tularemia was epizootic in that region among mice. Chronologically, the first workers to become sick were those who unloaded the sugar beets, thereby touching the infected portions, and then the workers who carried out primary processing of the roots. Infection occurred primarily through aspiration, causing a visceral form of tularemia in the majority of those who fell ill.

In the examples which have been cited, the tularemia outbreaks tended to be epizootic. The widespread vaccination against tularemia which was carried out in post-war years among specific groups of the population, limited the possibility of similar outbreaks to a considerable extent. In addition to this, epidemiological materials in recent years have pointed to the fact that certain industries systematically processing infected animals or infectious raw materials are very favorable to the zoonosis group (leptospirosis, Q-fever, ornithosis).

Thus, in Leningrad leptospirosis was recorded almost exclusively among workers in a meat-packing plant and its branches for a period of several years.

In urban plants processing meat, 32 cases of hemorrhagic leptospirosis and water fever were recorded between 1954-1957. In connection with this, the Leningrad Institute imeni Pasteur carried out a serological investigation among workers in a meat-packing plant to determine to what extent they were liable to pick up leptospirosis infection. On our suggestion, E. M. Popova in 1954-56 and L. E. Ionova in 1957 studied a total of 2,809 serums among workers in a meat-packing plant. The greatest number of positive reactions was observed in the sanitary slaughter house and the produce, meat, and intestines departments. On the whole, positive results were obtained almost five times more often among workers in primary processing departments than in sausage departments.

It must be assumed that among those who reacted positively there were some who had a very light form of leptospirosis; thus disease was not detected. There were also some in whom the infection process took place, but without any symptoms.

Taking into consideration the fact that workers in the so-called raw material departments of meat-packing plants are often injured on the hand, it must be assumed that injured skin is a main source of infection. Certain types of work are very dangerous (washing out the insides of animals, processing the bladders).

The greatest number of positive reactions occurred among workers who had been on the job for a long time. This fact can be explained by the nature of leptospirosis immunity, which makes it possible for the same person to be reinfected repeatedly by diverse sero-type leptospirea. The serum with the greatest number of positive reactions to leptospirea was the pomona-type (44%); antibodies to grippo-typhosa leptospirea comprised 17%; to sero-type L. tarasowi ("Perepelitsyn") 13%. Six per cent of the serums reacted with hemorrhagic leptospirea.

This proportion is not accidental, since swine, which are butchered systematically in a meat-packing plant, are the source of pomona-type leptospirea among farm animals.

As an illustration of the fact that workers in a given plant can be infected repeatedly, in a number of cases there was a positive reaction between lysis and agglutination, and other (compared to the first examination) sero-type leptospirae.

Under specific conditions, butchered animals are a main source of leptospirosis infection; and water fever thus loses certain epidemiological features which are characteristic to it. In cities, occupational leptospirosis can occur the year round.

Slaughtered animals, particularly cattle, can be infected not only with different sero-type elements inducing water fever (mainly with pomona-type leptospirae) but also with hemorrhagic leptospirea, which has bacteriological corroboration in specific cases.

The occurrence of water fever, caused by trippo-typhosa and pomona leptospirae, among workers in slaughter houses and meat-packing plants has been described by several Ukrainian authors; in blood serums for people working in these plants more than a year, the specific leptospirae antibody content was 18%.

In Germany the endemic disease Veil has been noted among workers

in slaughter plants. The results of research on this subject made it possible for Professor Kate, who was representing Germany at an international symposium (Lublin, 1958), to come forward with the characteristics of leptospirosis as an occupational disease.

As a result of a comparative serological study carried out in the USA of people hospitalized with diverse pathological processes and also of packing house workers, positive reactions between lysis and agglutination and pomona type leptospirae comprised 1.3% in the former case, and 6.4% in the latter case (i.e., packing house workers). Using these data as a basis, a conclusion was also reached as to the occupational nature of leptospirosis diseases. There is a possibility that leptospirae are interchanged between slaughtered animals, rodents, and dogs. Due to this fact, one prophylactic measure which can be taken is the systematic disinfecting (in the widest sense of the word) and examining of pets (for example, watch dogs) which live near slaughter houses for leptospirosis. The good prophylactic effect which was achieved by vaccinating the population in some southern rayons of the USSR raises the question of whether to expand immunization to potential danger spots, such as among workers in the raw materials sections of dairies. This has been done successfully in Leningrad.

The possibility of occupational infection from Q-fever is even greater, although its natural foci have been pinpointed at a number of locations in the USSR. In regard to the high sensitivity of the agents of this infection, they can be conveyed through an animal or plant to anyone. The processing of meat, skin, wool, fur, cotton, etc. can be the direct reason for group illnesses in the most diverse industries (foodstuffs, textiles, leather). In addition to this, the fact that there are no symptoms to indicate the presence of Q-fever in farm animals makes it very difficult to discover the source of this infection and to take the necessary hygienic measures.

In the USSR and neighboring countries, Q-fever among slaughter house workers is quite common. Serological examination of workers in the so-called raw material departments of meat-packing plants could be an unusual way to determine the presence or absence of Q-fever foci among farm animals.

Due to the fact that Q-fever is highly resistant to desiccation, infection via air and dust is a possibility in animal and plant processing. There are many examples in the past of individuals and groups becoming ill with Q-fever during wool processing (particularly in the washing sections of spinning mills) and of outbreaks of this disease among textile workers.

On the basis of our data on the total number of Q-fever cases recorded in Leningrad between 1955-56, 47.5% occurred in cotton processing plants, with the greatest number of these taking place in preparatory departments.

Foreign literature contains reports on outbreaks of Q-fever in connection with processing infected cotton.

In addition to groups of people becoming ill in cotton processing plants, we have noted separate cases of Q-fever in factories or artels

where unfinished goods or refuse from cotton processing plants were used.

As a rule, Q-fever is benign, although in some cases it tends to be a chronic illness. Nevertheless, there are various after-effects. E. N. Markova and N. A. Mikhaylova have made a catamnestic study (in periods of two months to two years) of 130 men who had Q-fever. It was found that after Q-fever had persisted for a long period it was possible to detect asthenic phenomena, neurologic symptoms and pronounced vegetative disturbances. The authors thus came to the conclusion that individuals with Q-fever must be observed in dispensaries.

In recent years, the existence of ornithosis has been found in the USSR; this is connected with both wild and domestic fowl; in particular, ornithosis has been found among personnel at poultry farms. The ornithosis virus was isolated by a microbiological study of different types of fowl.

In Leningrad one of the ornithosis foci was found to be a culinary school which fattened, killed, and processed domestic fowl. As the serological study made in our laboratory in 1958 has shown, specific antibodies were found in 31% of the workers at this school; the area where the fowl were slaughtered proved to be the most likely spot for ornithosis infection. In connection with the pathogeny of ornithosis infection, the elimination of dust, particularly improved ventilation systems, is an important prophylactic measure with both ornithosis and Q-fever.

Due to the fact that in certain food plants connected with the slaughter and processing of different types of meat zoonosis infections can occur not only in well-pronounced cases but also in symptom-free cases, industrious detection of these diseases using laboratory methods, including immunization, is extremely important.

### Conclusions

1. In recent years a great deal of attention has been given to the fact that individuals or groups are becoming ill with leptospirosis, Q-fever, and ornithosis in several food producing plants (slaughter houses, meat-packing plants, dairies, meat canneries, culinary schools, etc.) Cases of Q-fever have also been found among textile workers (for example, cotton processing plants) and workers in the leather and fur industries.

These diseases have been observed primarily in the so-called raw material departments or the primary processing departments for animal and vegetable raw materials. Infection usually occurs through direct contact (leptospirosis) or via the air (Q-fever, ornithosis). Zoonanthroponosis infections lasted for a long period of time in many cases.

2. Leptospirosis, Q-fever, and ornithosis occur in the form of a fever accompanied not only by a clinical symptomatic complex but also by a subclinical complex; the latter form appears retrospectively as a result of serological examinations of workers for occupational diseases.

3. The existence of a group of zoonanthroponosis diseases in

specific industries, particularly food producing plants, expands the list of occupational infections. The tasks of introducing additional prophylactic measures in several industries, of intensifying sanitary inspection in them, and of solving organizational-legal problems (arbitration between labor and physicians, etc.) is now facing the pathologists and epidemiologists who handle occupational diseases.

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